R* and the Global Economy

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Navigating by the Stars

π^*, g^*, u^*, … r^*

One explanation for declining interest rates

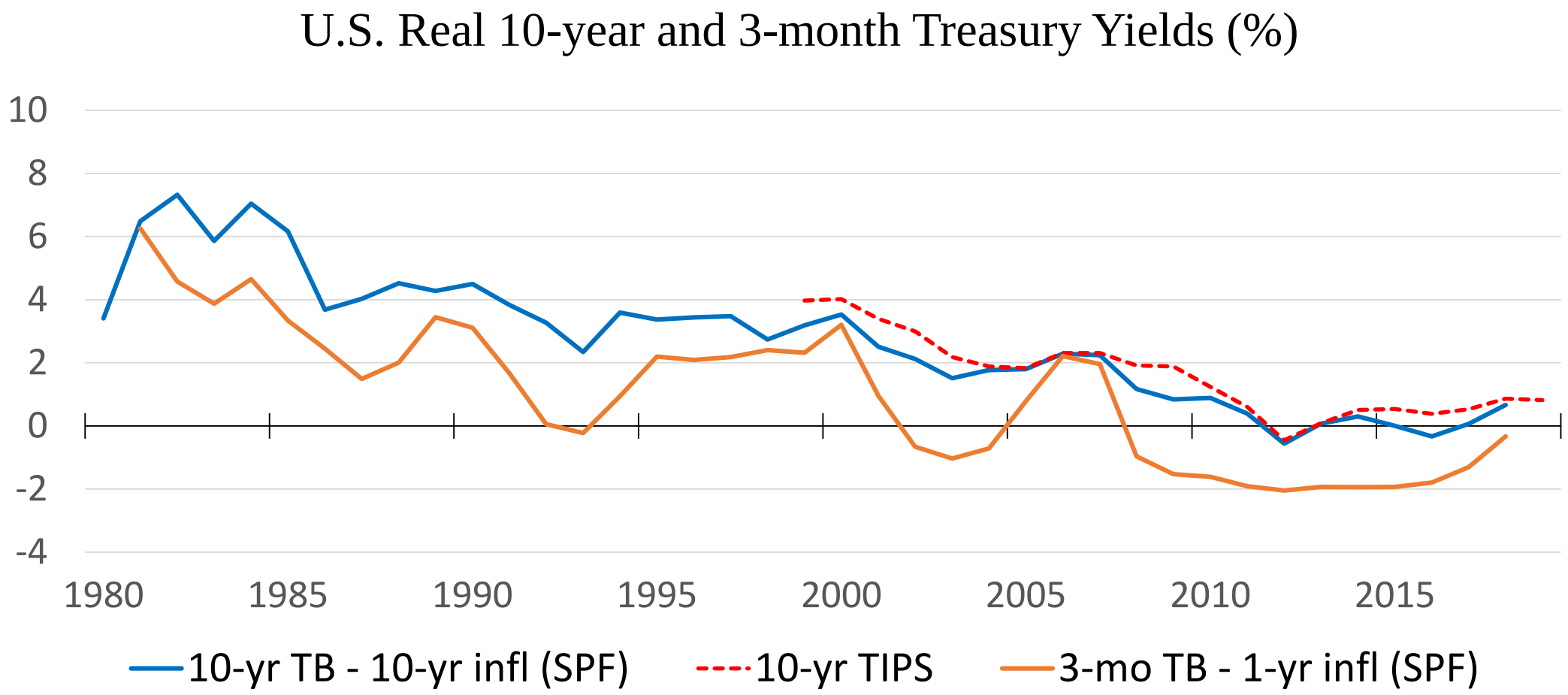
Other explanations for declining r*

- Supply-side phenomena: lower productivity growth, aging populations
- Demand-side phenomena: insufficient demand, secular stagnation
- Portfolio preference shifts, growing global safe asset demand

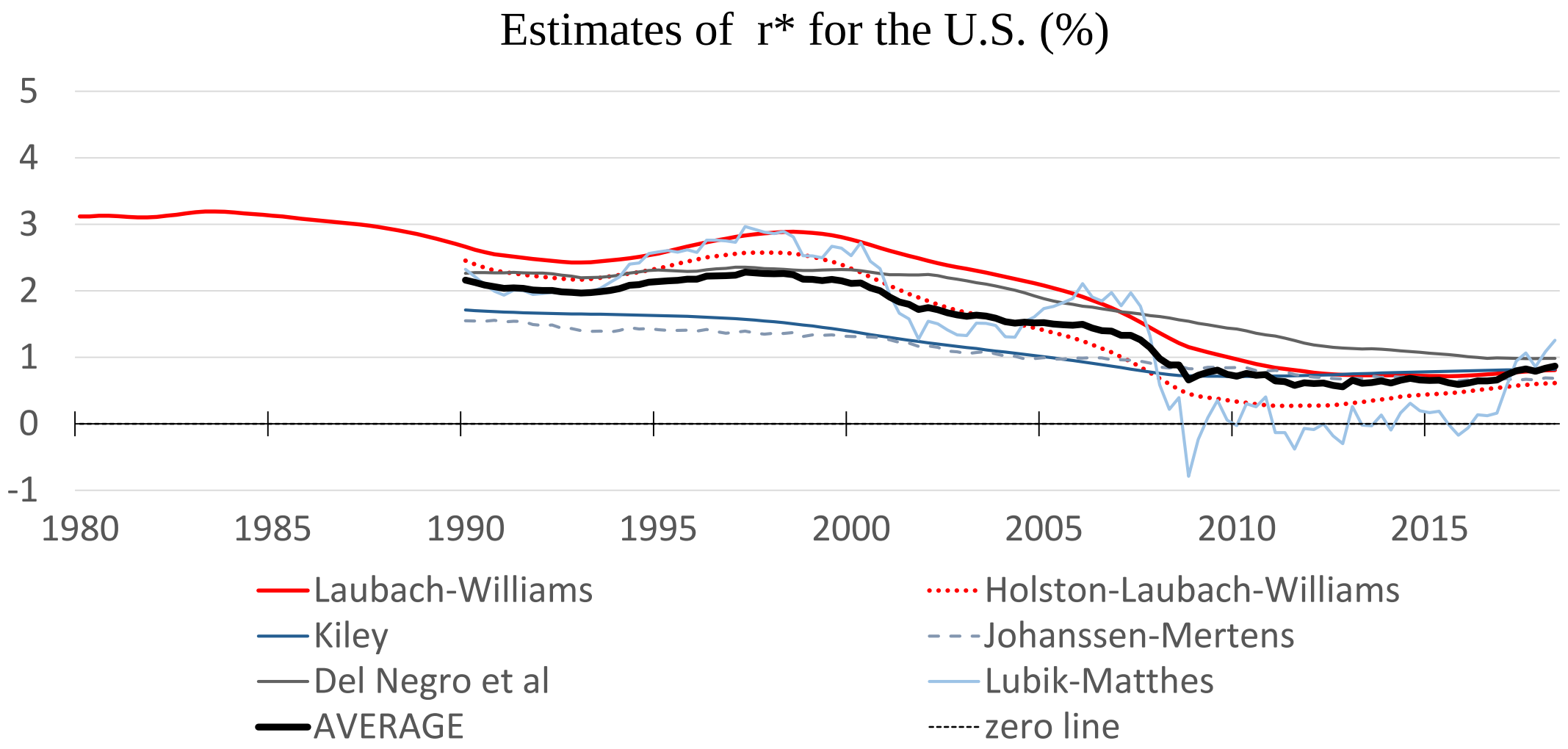
Outline

- Estimates of r* in U.S. and abroad
- Possible Drivers of r *
  - Saving-investment balance
  - Safe asset supply and demand
- Empirical evidence
  - Saving, investment factors
  - Asset preferences, foreign demand for U.S. assets
- Implications for U.S. monetary policy

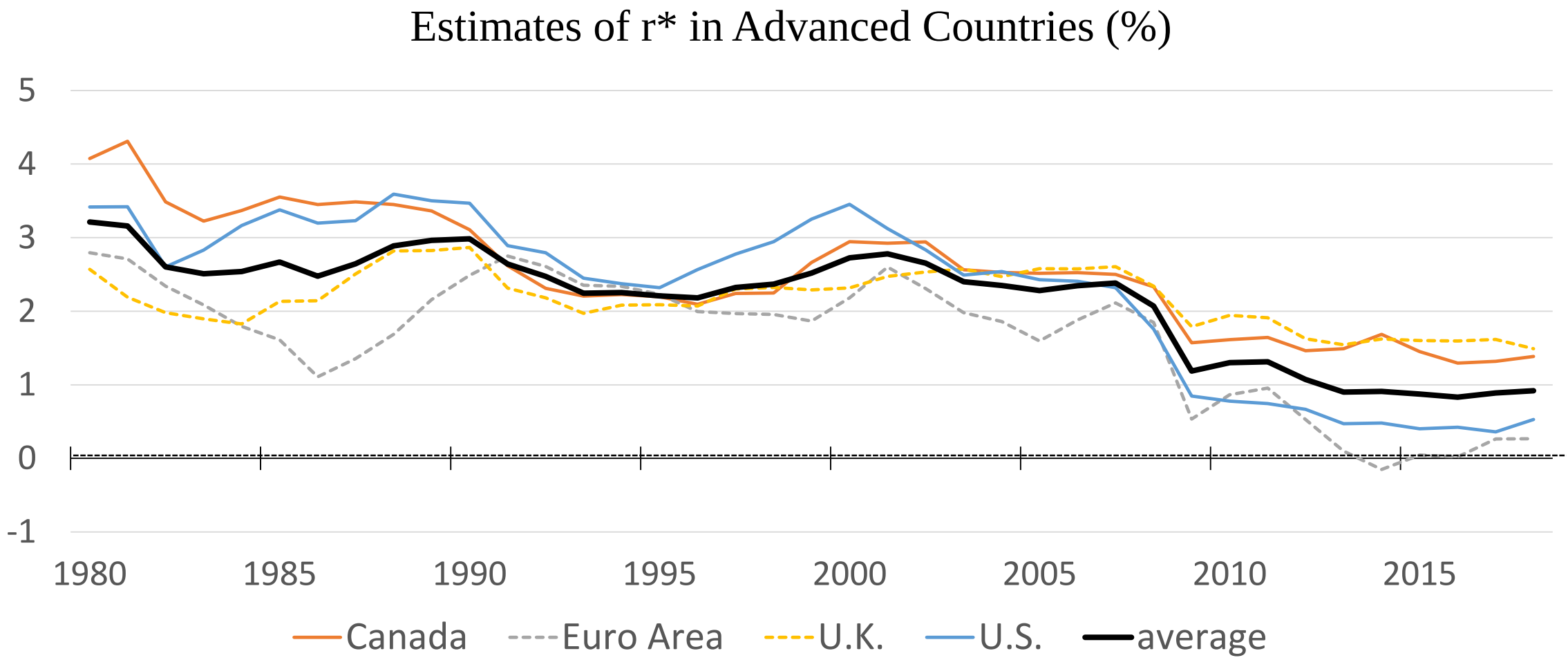
U.S. real rates have been falling



Estimated r* in U.S. has been falling

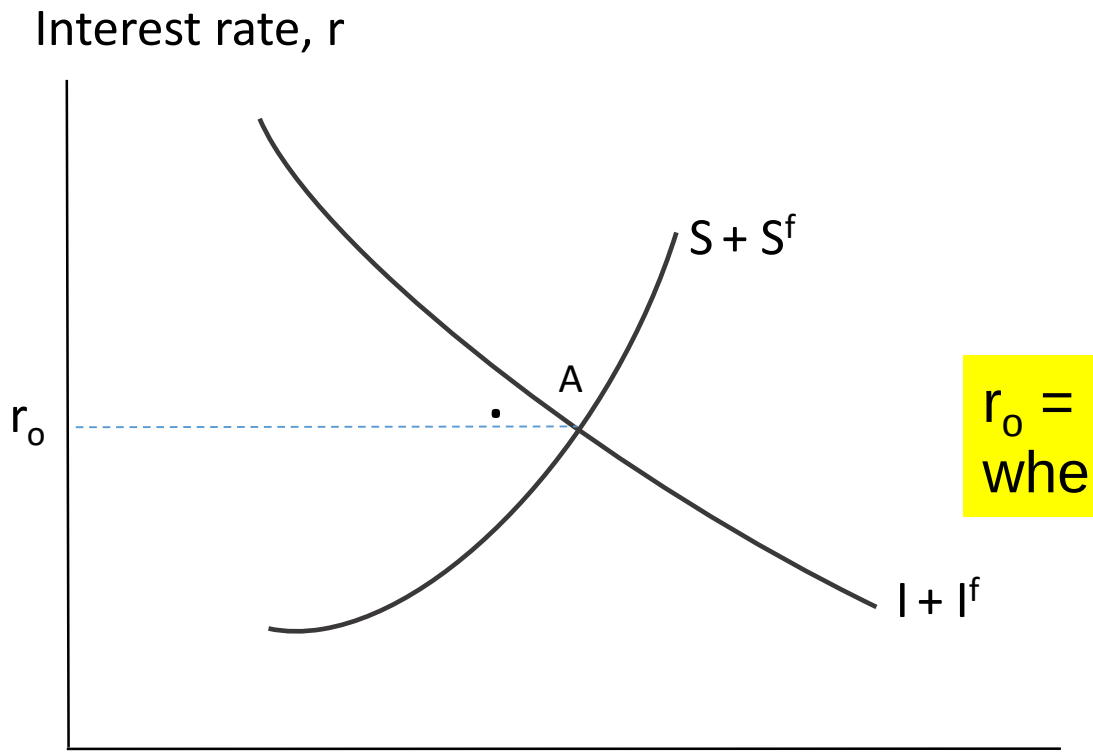


r* in other countries has fallen as well



Source: updated figures from Holston et al. (2017) and FRBNY website.

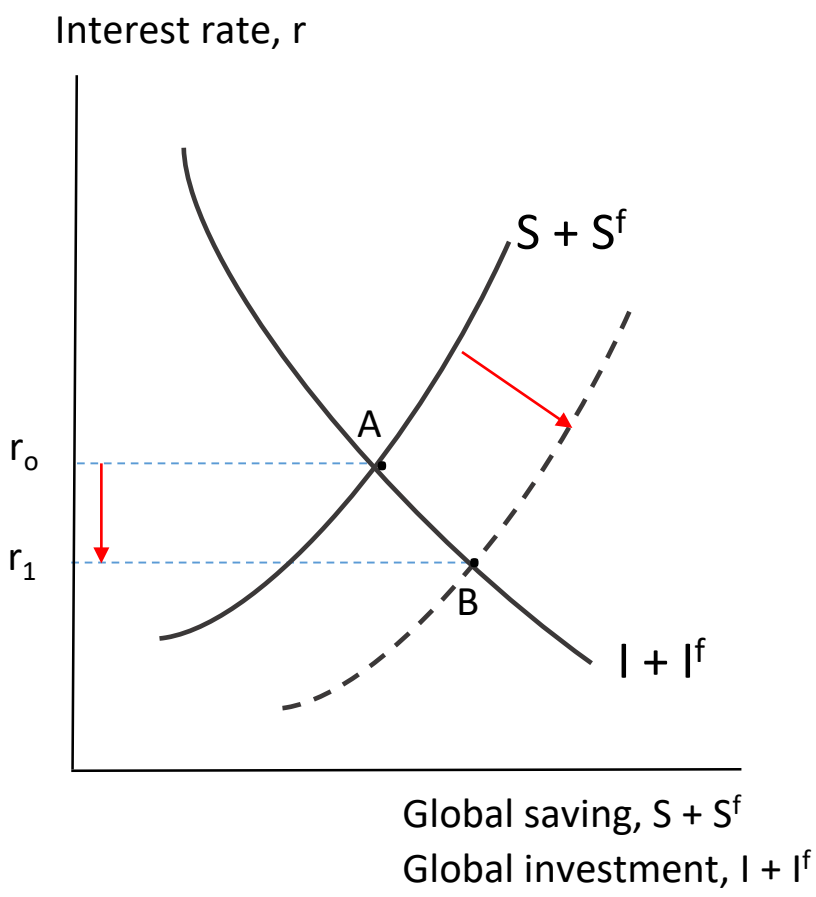
Saving and Investment Balance Approach to Determining r*

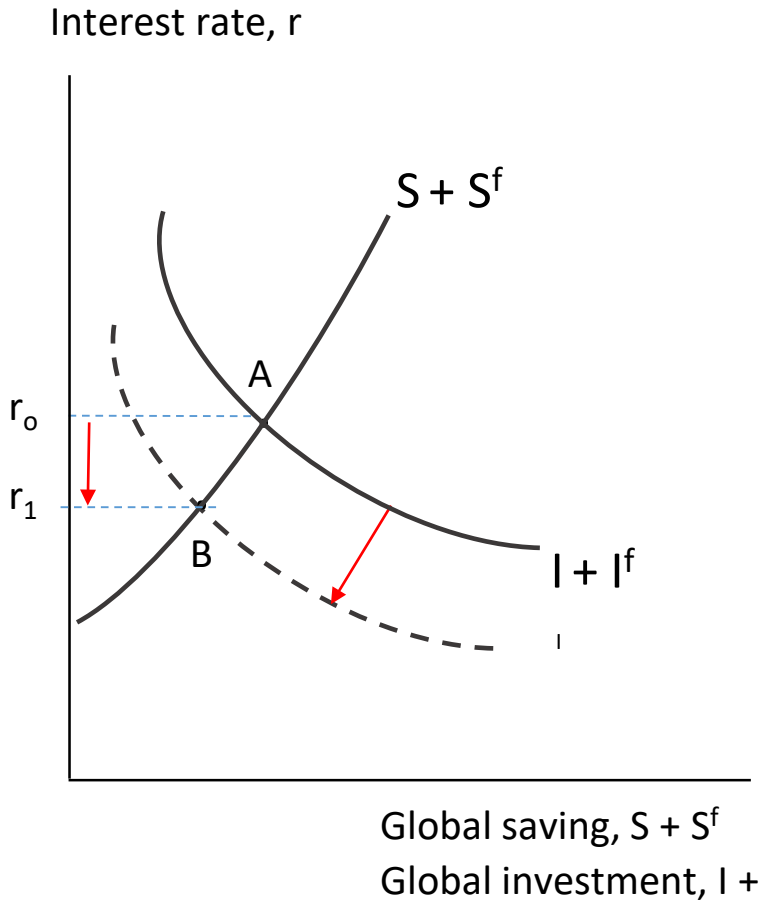


$r_o = r^*$
when $y = y^*$, $y^f = y^{f*}$

Saving increase or investment decline lowers equilibrium interest rate

Effects of Saving Increase and Investment Decline on Interest Rate





Possible drivers of declining r*

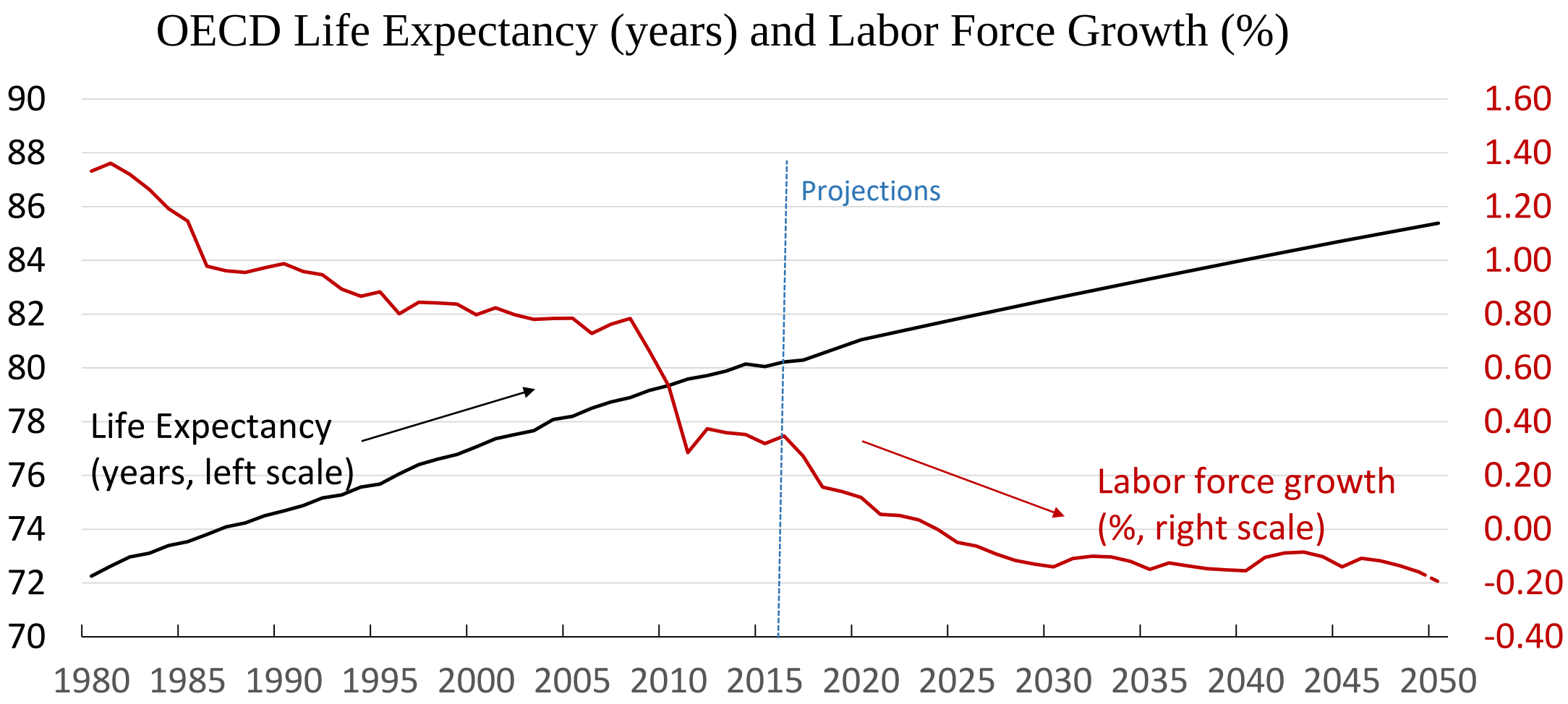
Factors increasing saving

- Demographics: Longer lifer expectancy, lower dependency burdens
- Rising inequality
- Excess foreign saving
- Greater risk aversion, portfolio shift towards safer assets

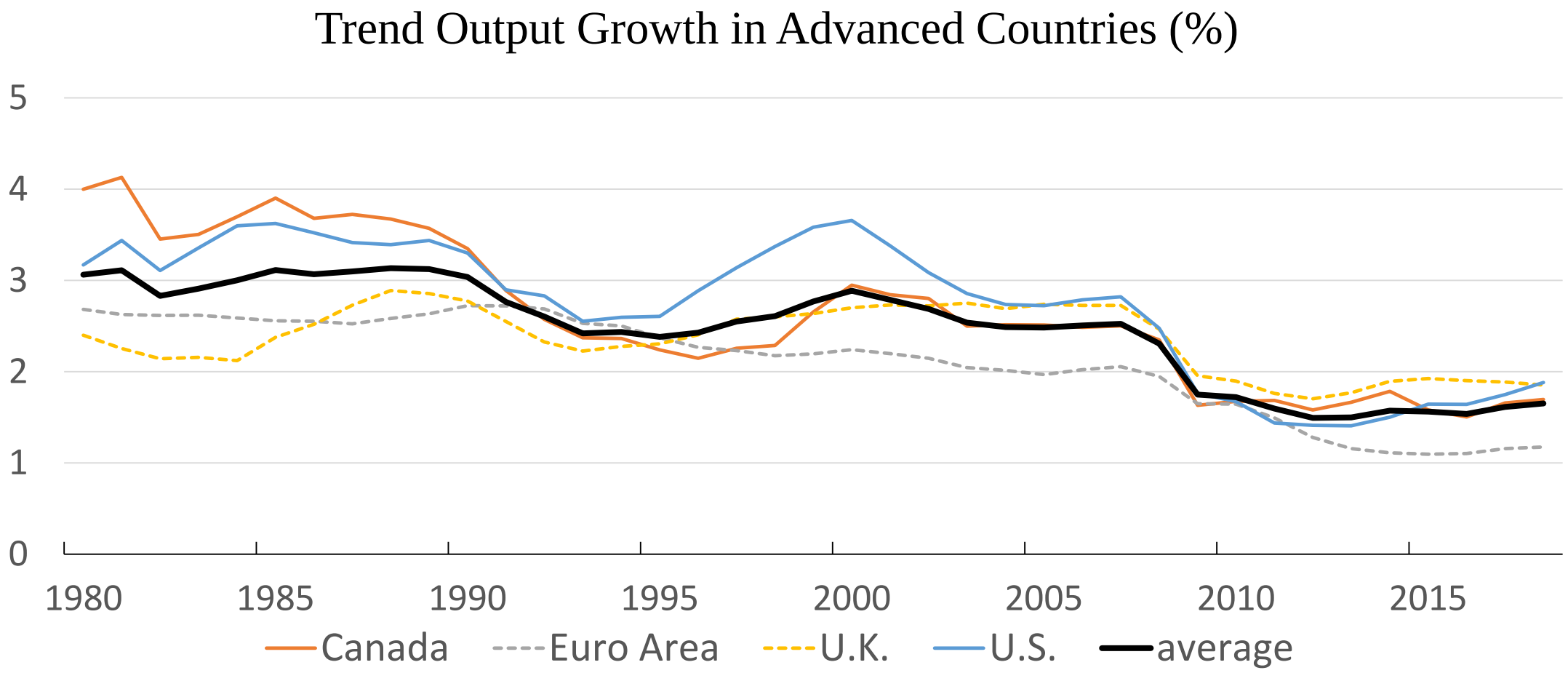
Factors decreasing investment

- Demographics: Slower labor force growth
- Lower productivity growth
- Reduced investment profitability
- Declining competition

Life expectancy increasing, labor force growth falling in advanced countries



Potential output growth falling in advanced countries



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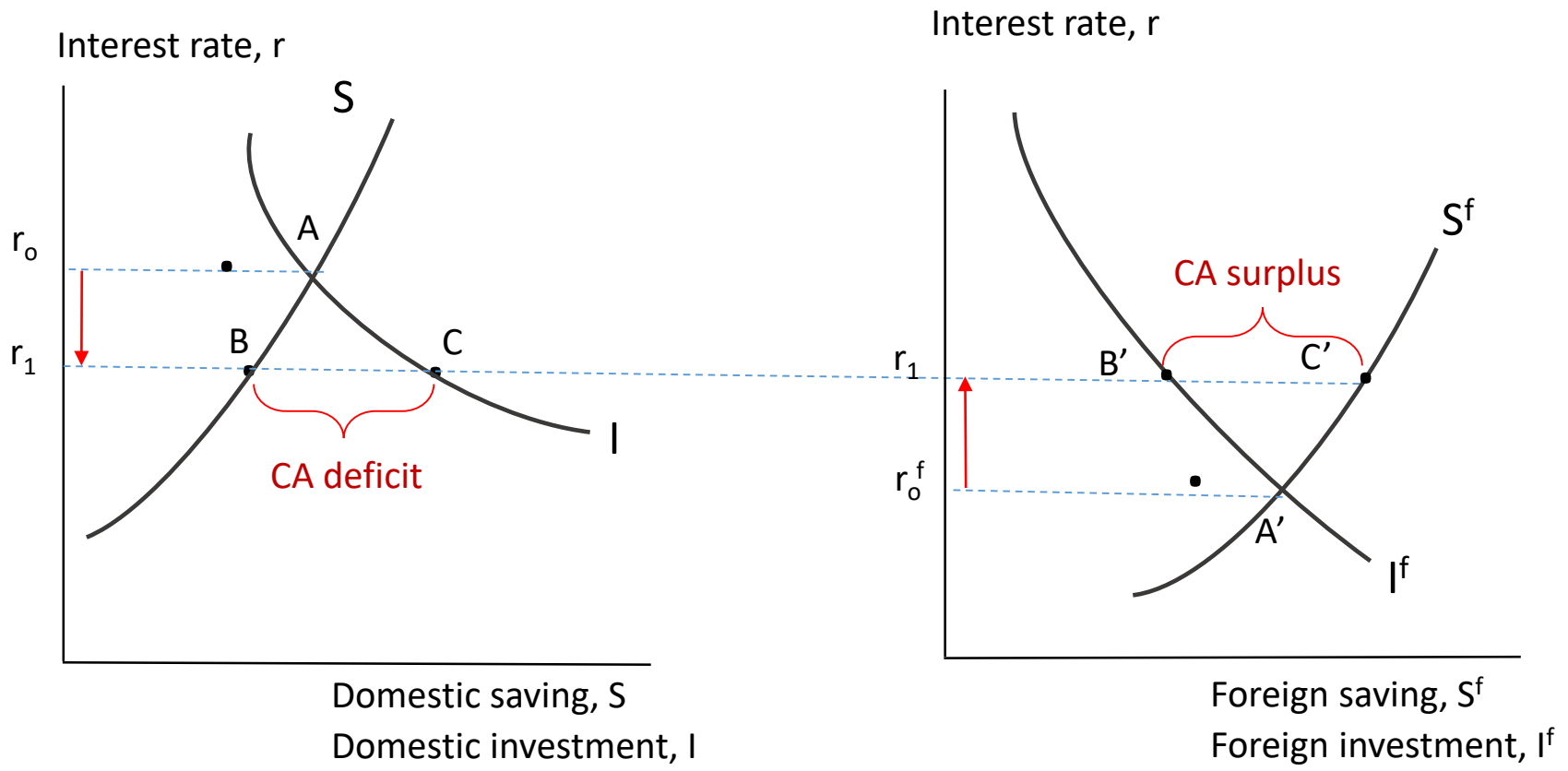
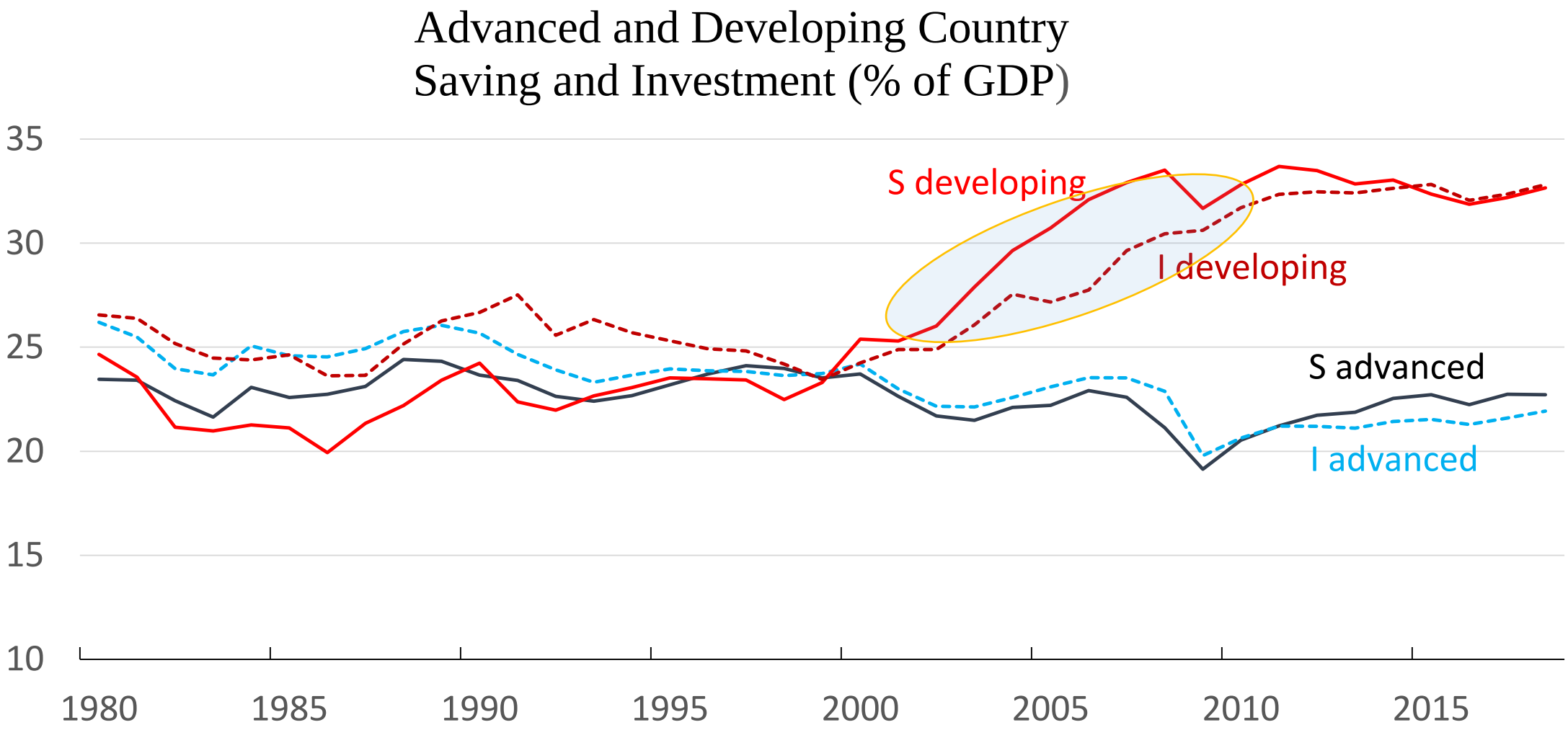
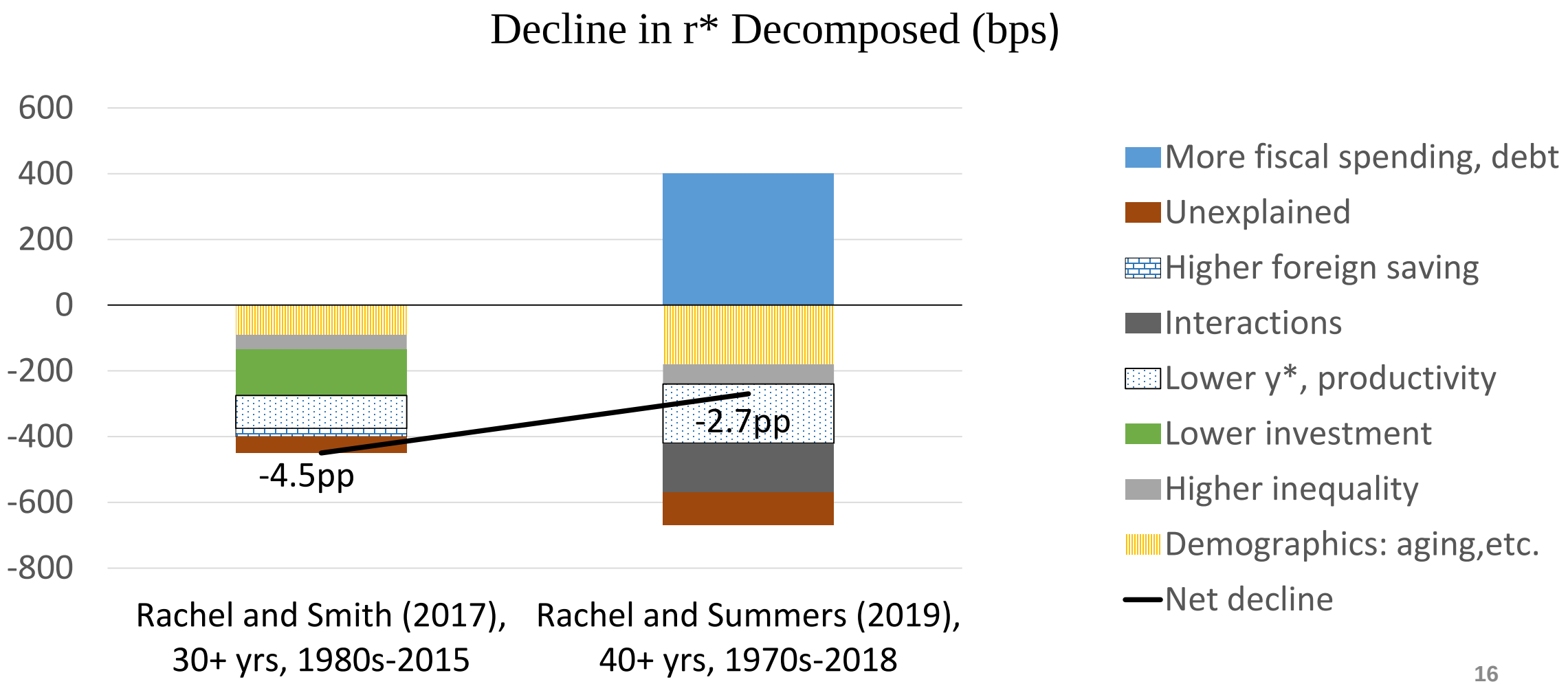
Excess foreign saving decreases domestic interest rate



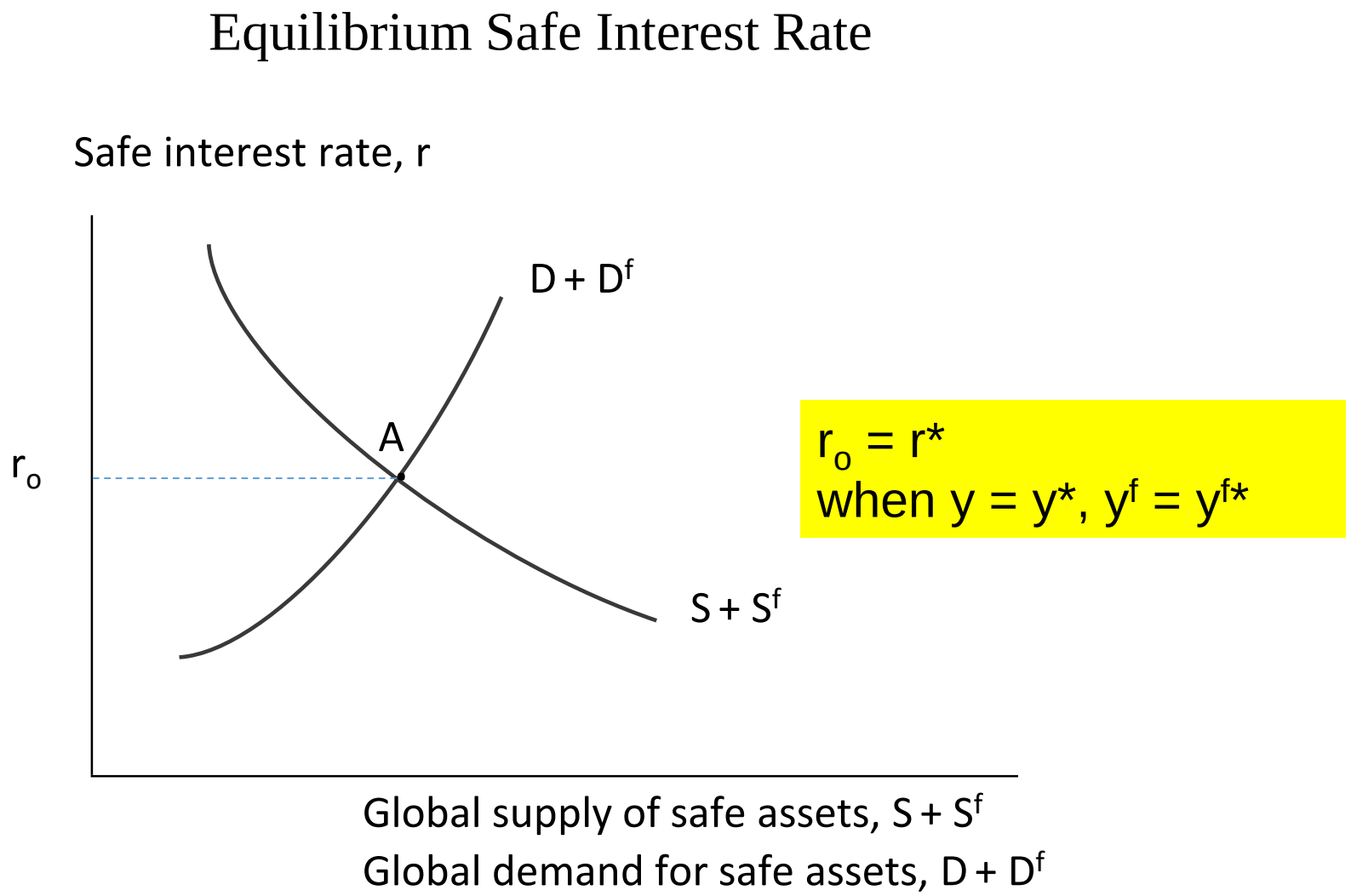
Excess saving in developing countries in 2000s



Saving & investment factors contributed to decline in r*



Safe Asset Approach to Determining r*



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when $y = y^*$, $y^f = y^{f*}$

Properties of safe assets

Provide

- Security, i.e. pay close to par in the future
- Liquidity, i.e. money-like in availability and acceptability

Play parallel roles to money:

- Transaction role by serving as collateral in financial transactions and regulatory capital in meeting liquidity requirements,
- Accessible store of value role by providing a reliable return
- Accounting role by serving as a benchmark for the pricing of other assets

Who supplies safe assets?

- Governments: e.g. Treasury securities, currency, central bank reserves
- Private financial sector: deposits, commercial paper, asset-backed securities

Note:

- Governments may enhance the security of privately-created assets by providing guarantees, e.g. deposit insurance for bank deposits.

- Safe assets are not all perfect substitutes in terms of their liquidity or safety properties.

- "Frontier" between safe and unsafe assets can be sensitive to changes in perceptions of security, credit quality (Gourinchas& Jeanne)

Possible drivers of declining r* for safe assets

Factors increasing demand

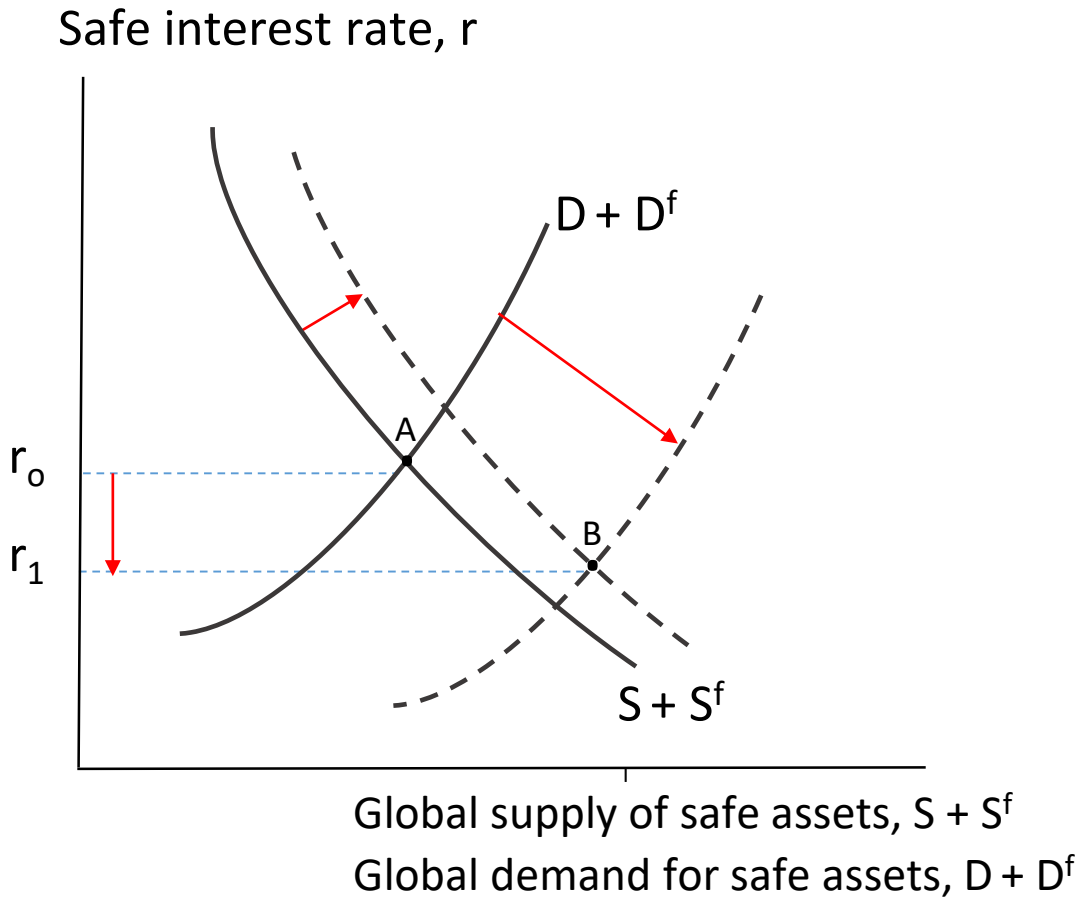
- Economic growth
- Greater precautionary demand
- Regulatory reform that increases demand for high-quality collateral

Factors decreasing supply

- Decreased credit quality of government or private safe assets
- Fiscal austerity that reduces supply of government asset issuance

Caballero et al. view of the world: Global shortage of safe assets lowers interest rate

Effect on Safe Rate r if Demand Increases More Than Supply



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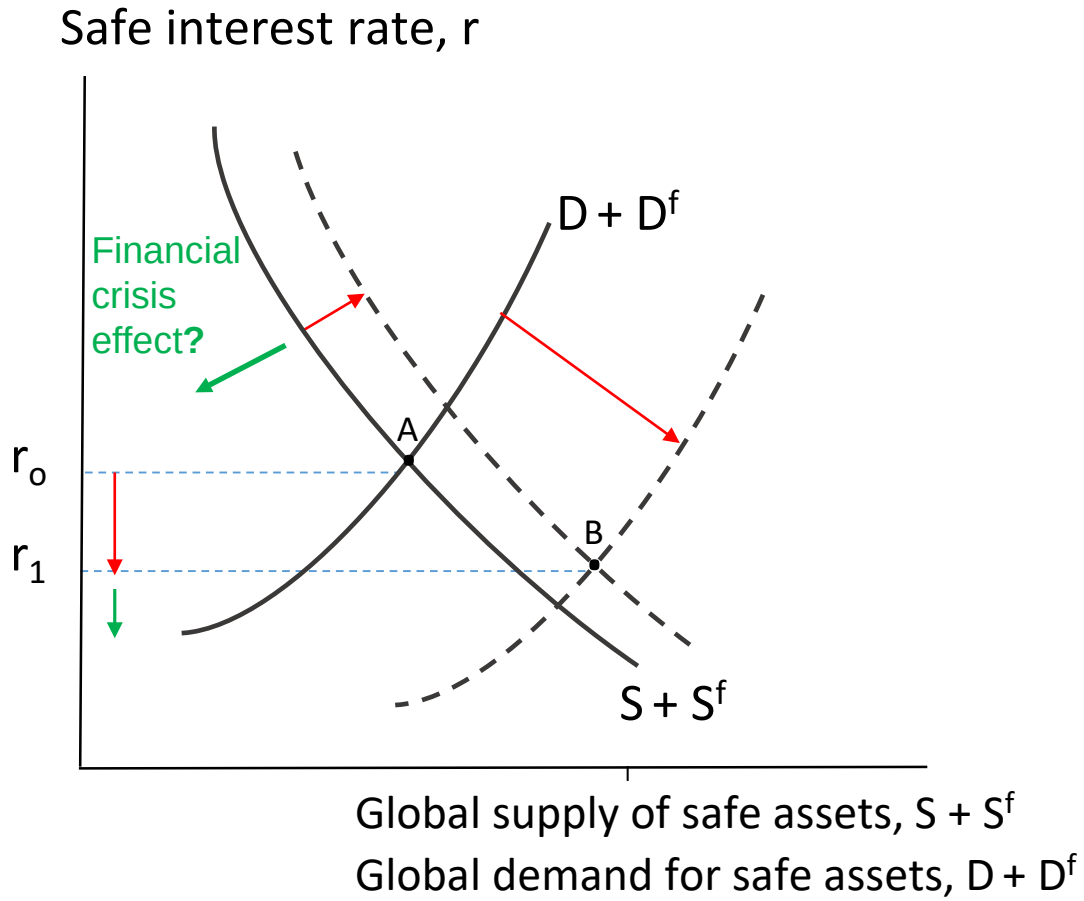
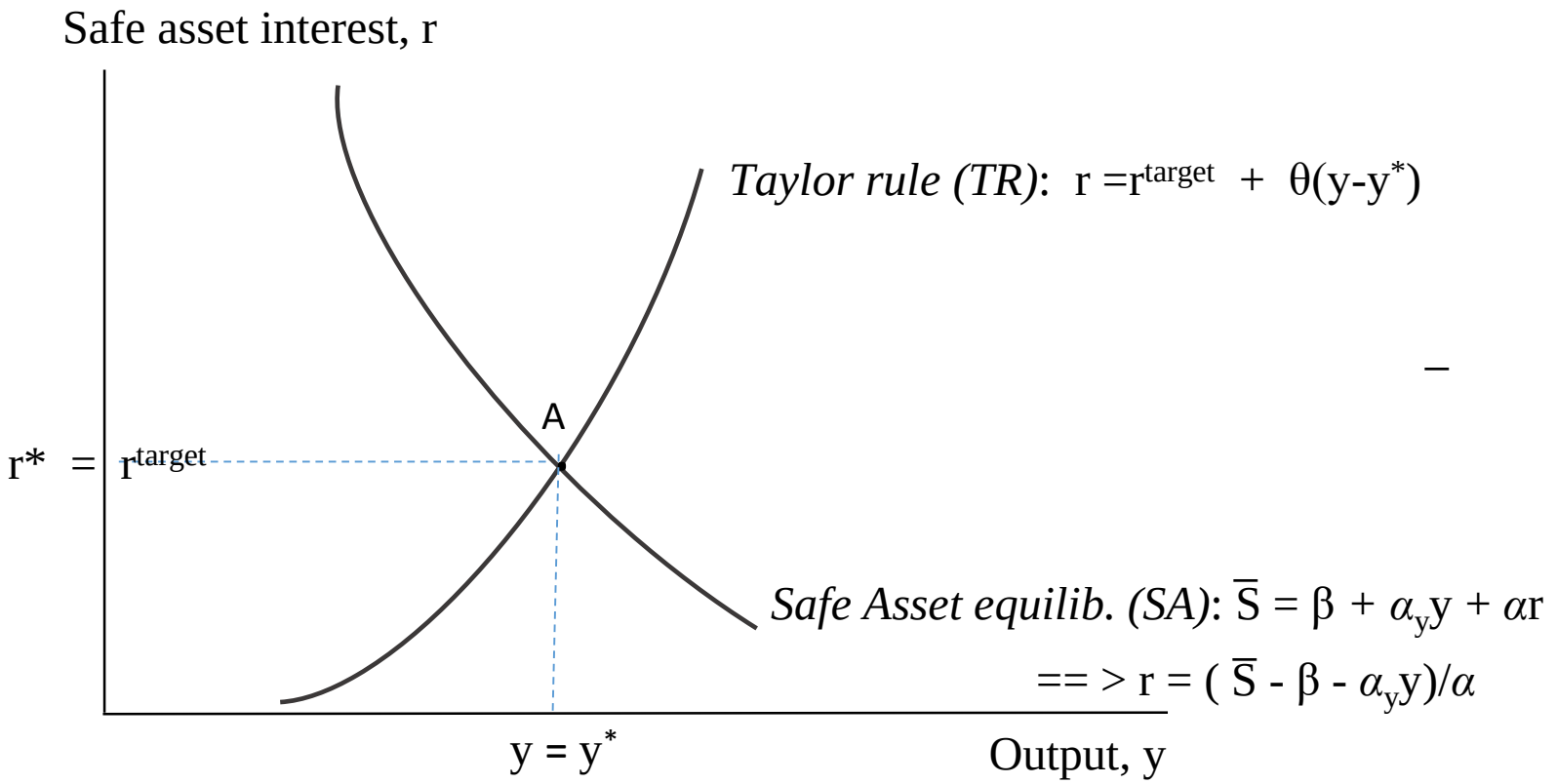


Determination of Safe Rate in "General Equilibrium" Caballero, Farhi, Gourinchas, AER, 2016

$$\textit{Safe Asset Equilibrium}\,(SA): \quad \bar{S} = \beta + \alpha_y y + \alpha r$$

$$\textit{Taylor Rule}\,(TR): \quad r = r^{target} + \theta(y - y^*)$$

$$\textit{IS curve}: \quad y = y^* - \delta(r - r^*) - \delta_r(r_r - r_r^*)$$



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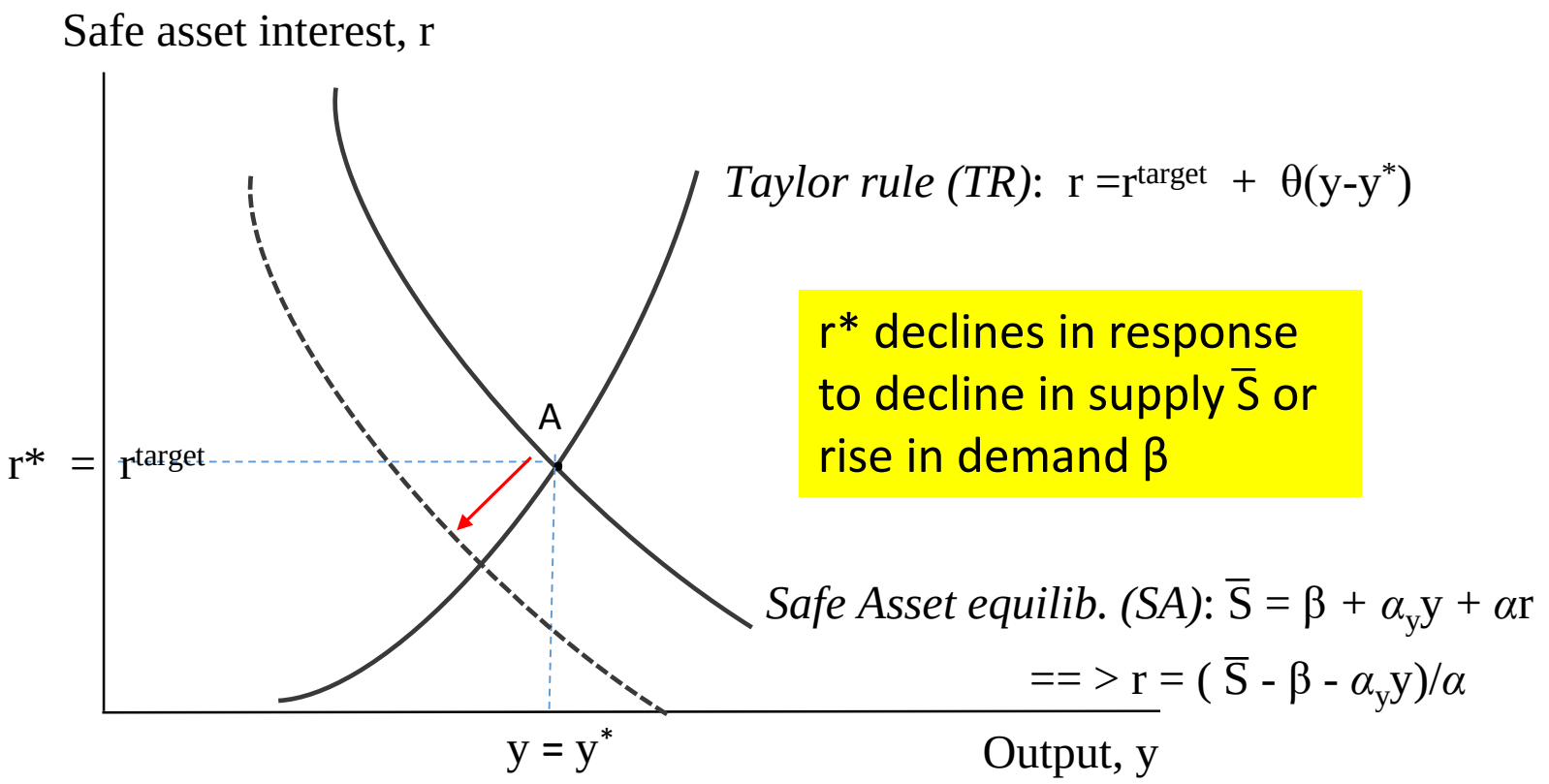
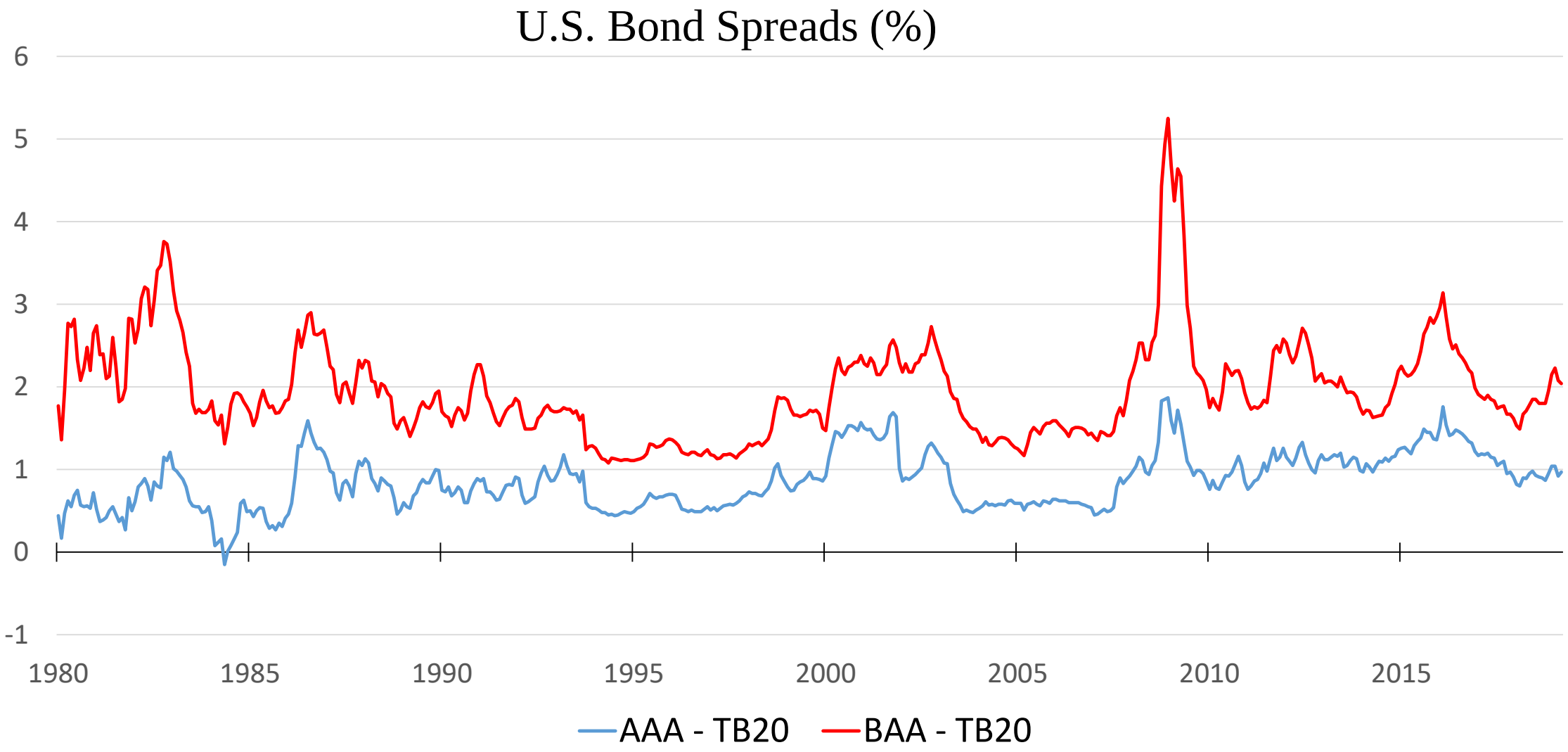


Empirical Evidence

- Price-based evidence:
  - Rate spreads
  - Risk premia

- Quantity-based evidence:
  - Holdings of government and private-provided safe U.S. assets by domestic and foreign sectors

Are Bond Spreads Rising?
Del Negro et al. vs. Rachel and Summers



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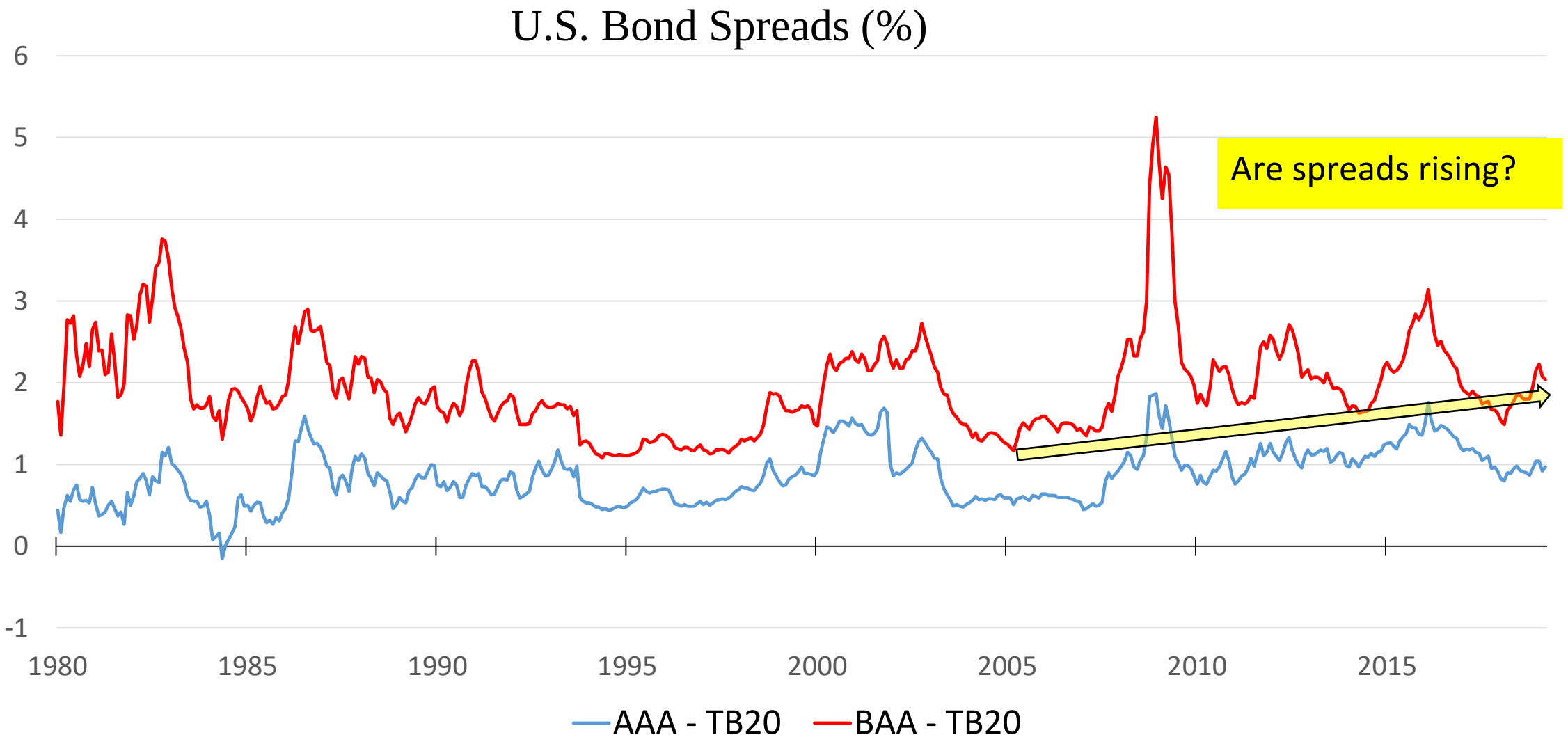
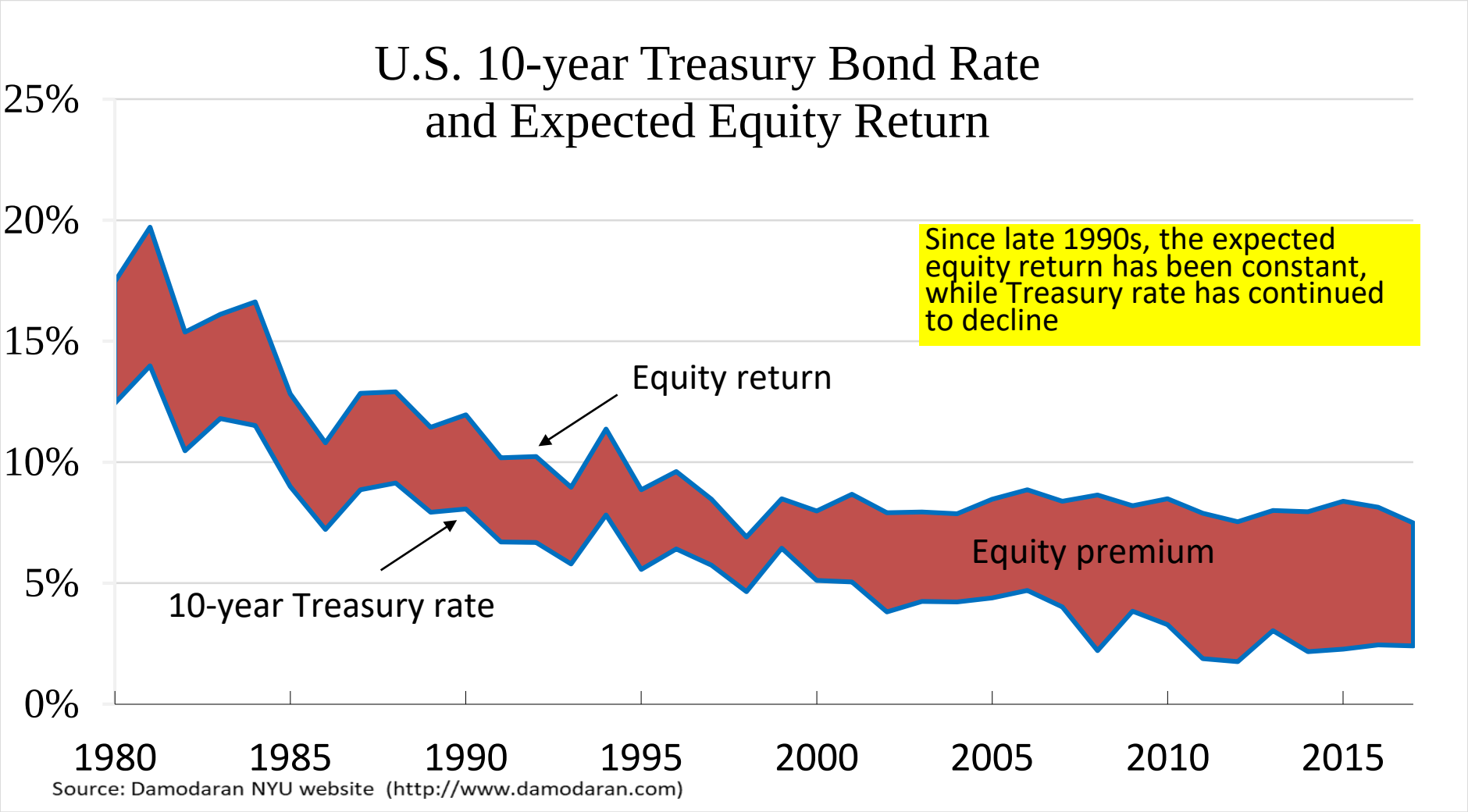
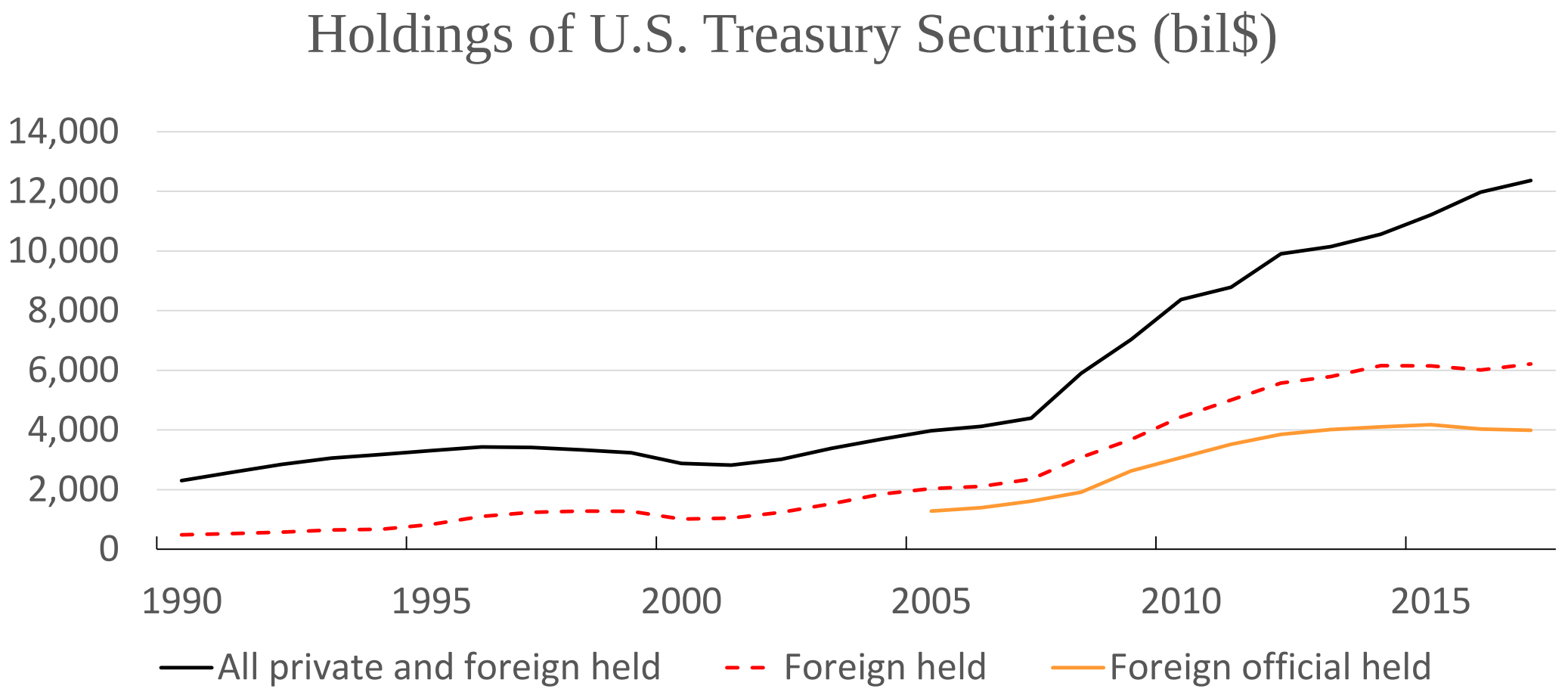


Equity premium increasing since late 1990s



Foreign holdings of U.S. Treasuries rising since 1990s



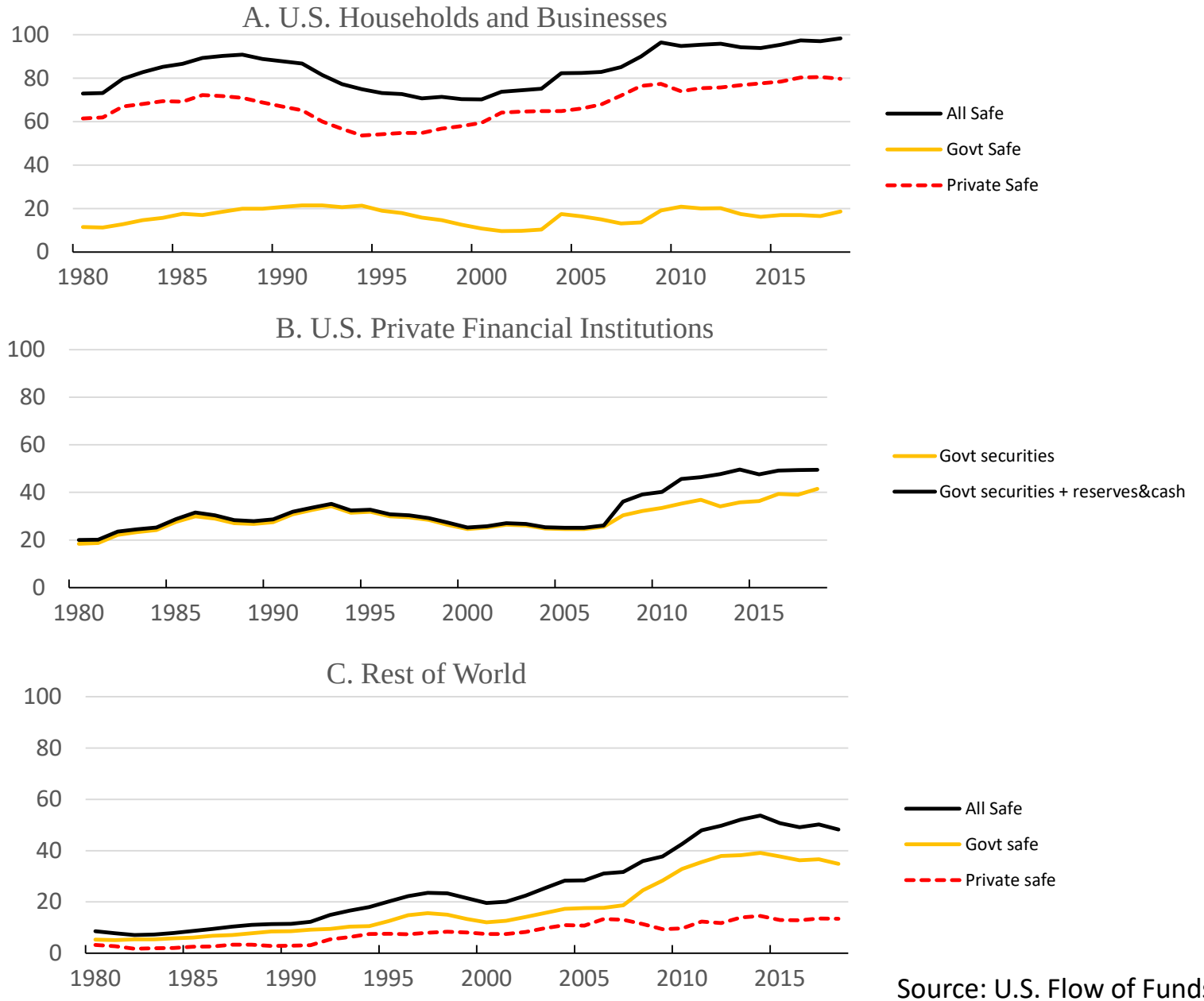
Source: Treasury Bulletin, Treasury International Capital (TIC) reports

Measuring holdings of U.S. safe assets by U.S. and foreign creditors (Gourinchas and Jeanne, 2012)

- U.S. households&non-financial businesses ("private real sector")
  - Govt. safe assets: U.S. Treasury&municipal securities
  - Private financial-sector-provided safe assets: checking, time, and saving deposits, shares of money market mutual funds, commercial paper, repos.
- U.S. financial sector
  - Govt. safe assets: U.S. Treasury&municipal securities, cash and bank reserves at Federal Reserve.
- Rest of world
  - Govt. safe assets: U.S. Treasury and municipal securities, SDRs, and currency.
  - Private financial-sector-provided safe asset holdings: time and saving deposits, shares of money market mutual funds, commercial paper, and repos, foreign-affiliate-related interbank transaction levels.

Note: safe asset measures do not include direct debt and ABS securities issued by U.S. Agencies or GSEs, nor "private label" ABS issued within financial sector. Examined separately below.

Holdings of U.S. Safe Assets by Sector (% of GDP)



Source: U.S. Flow of Funds

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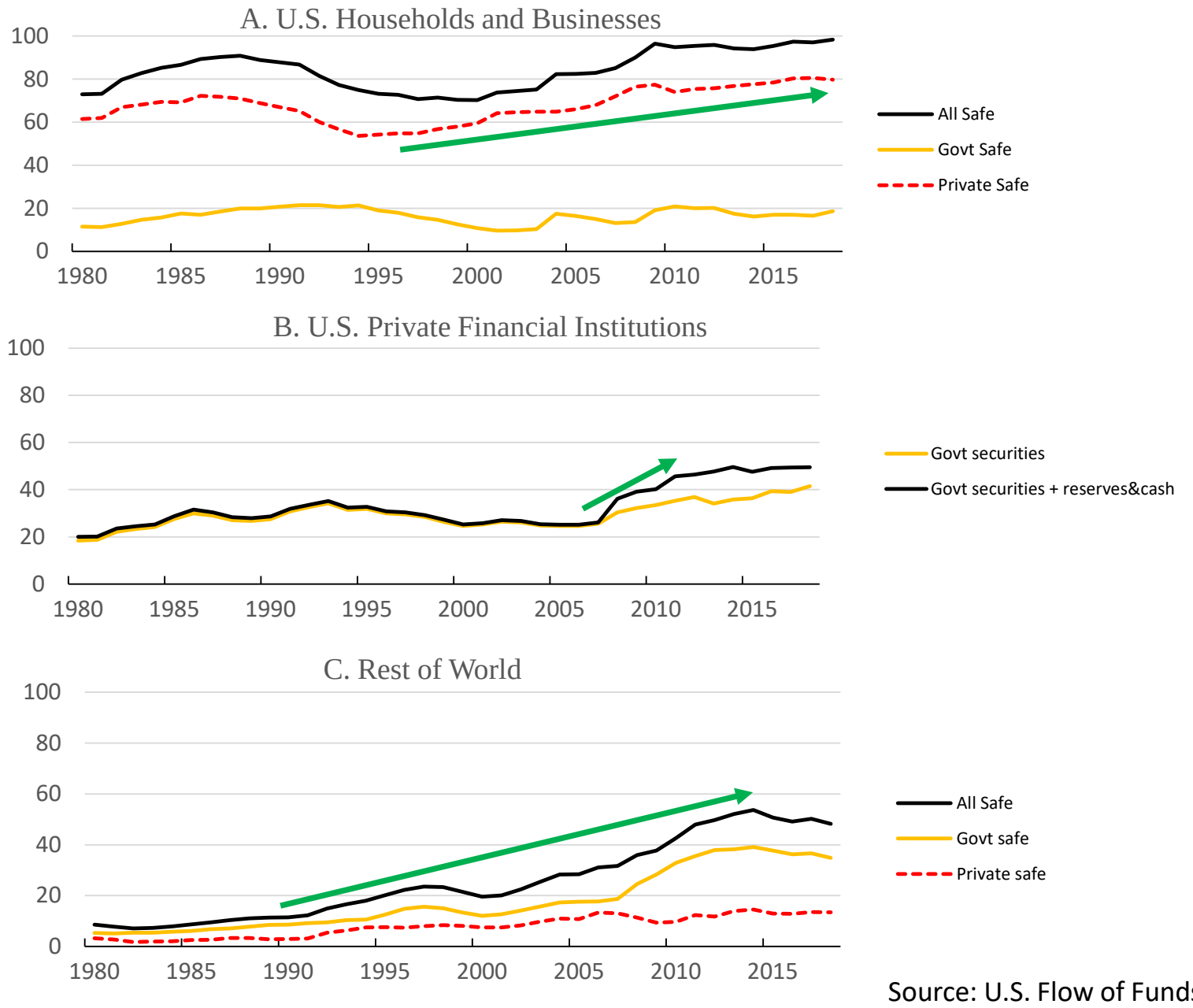
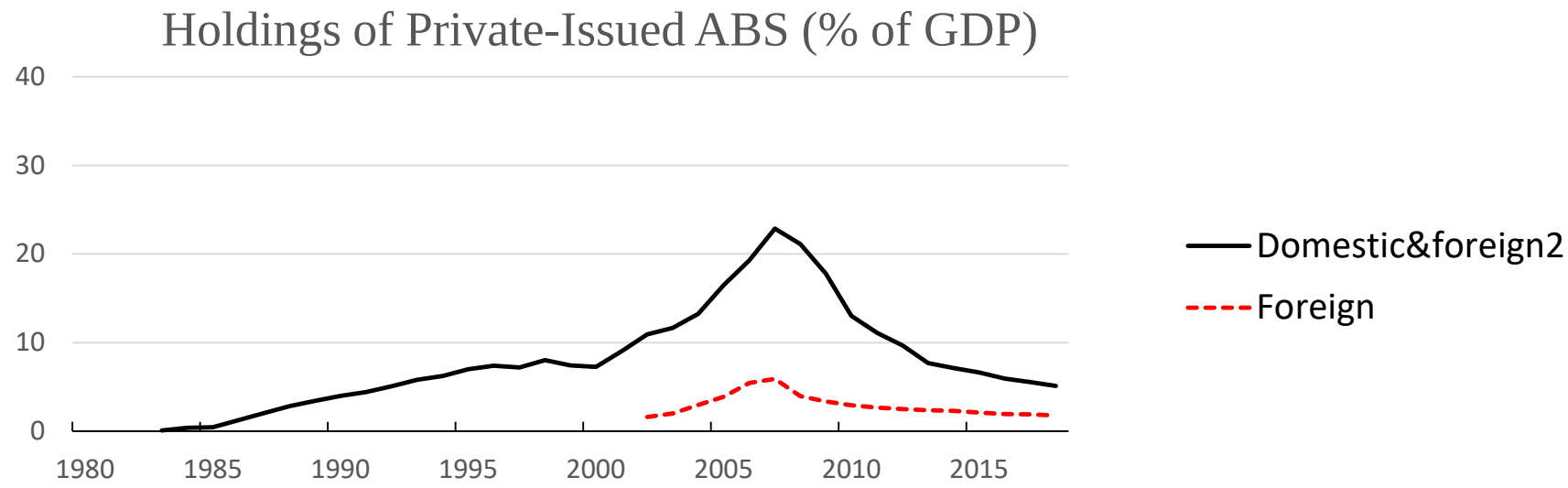


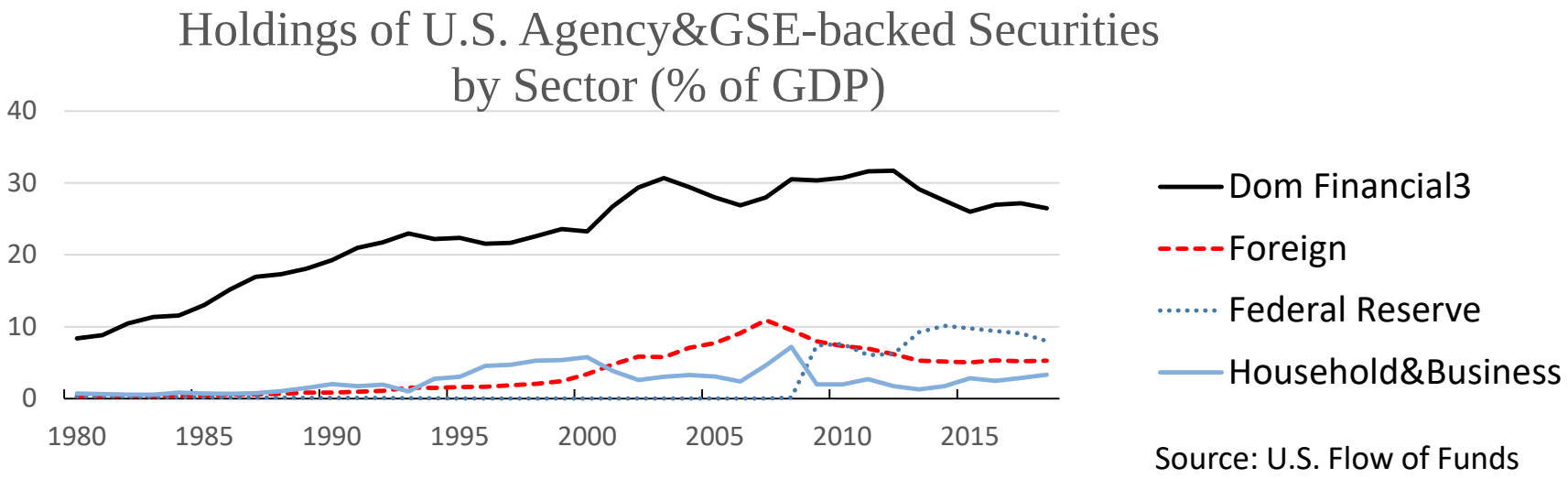
Source: U.S. Flow of Funds

Safe Asset Holding: Stylized Facts

- U.S. household&business holdings of safe assets rose steadily in late 1990s through 2000s boom period, and continued to rise after financial crisis to almost 100% of GDP
  - Most of increase took form of private safe assets
  - Government safe assets continue to constitute a very stable 20% of GDP
- U.S. financial sector holdings of government safe assets stable at roughly 25% of GDP until crisis, when doubled to roughly 50% of GDP.
  - Increases took form of both more government securities and bank reserves, with reserves rising dramatically as result of Fed's QE program.
- Ongoing trend of foreigners acquiring more U.S. safe assets, increasing from 10% in 1980s to roughly 50% of GDP.
  - Share of government safe assets rose, while private asset share fell.

Foreign holdings of private ABS and Agency&GSE-backed securities rose in leadup to crisis, plummeted after crisis



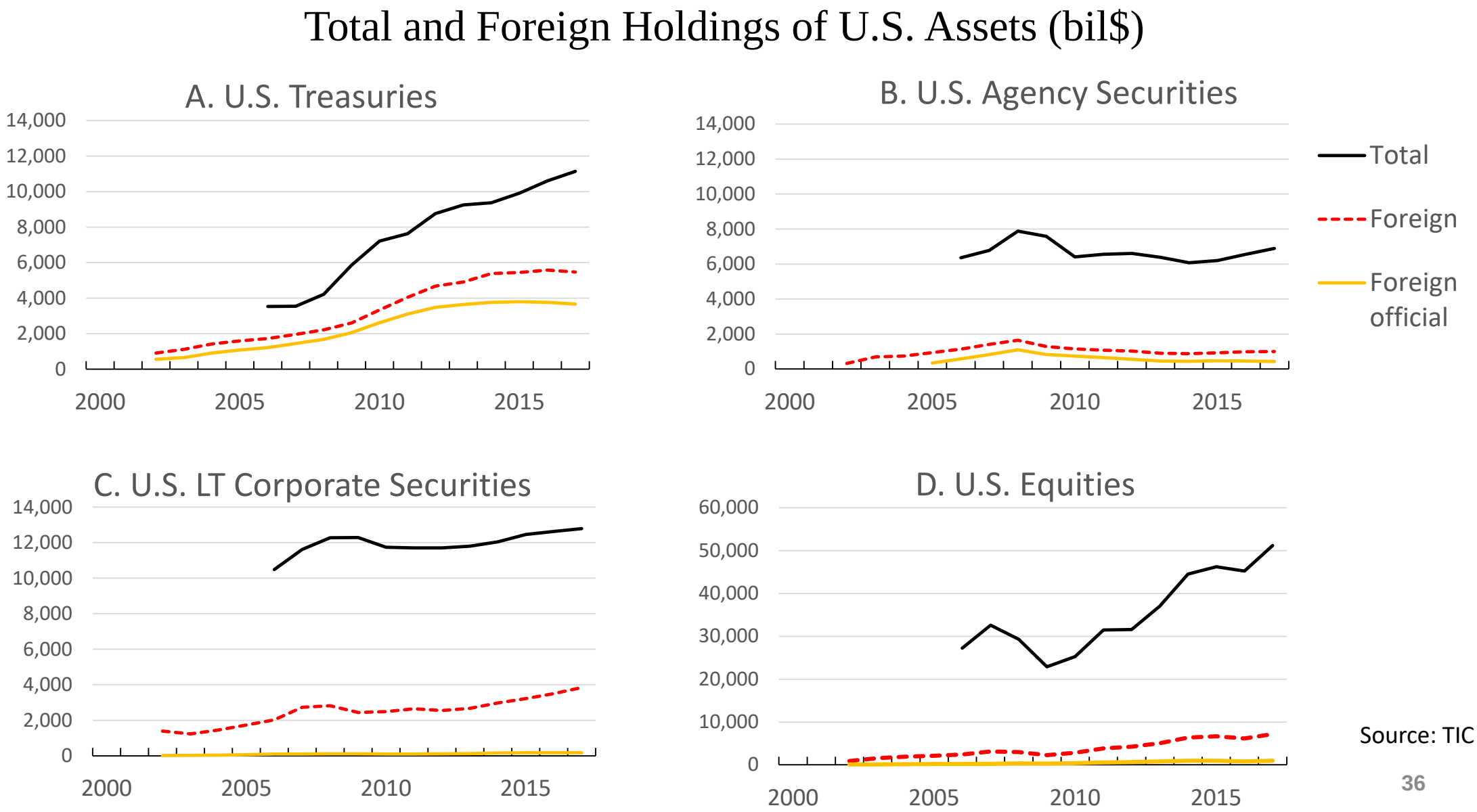


Source: U.S. Flow of Funds

Safe Asset Holding: More Stylized Facts

- U.S. private-issued ABS
  - Domestic and foreign holdings rose steadily before the crisis, then plummeted.
  - At their peak, foreign holdings accounted for about 1/3 of the total.
- Agency & GSE-backed securities
  - Domestic and foreign holdings increased steadily before the financial crisis.
  - At their peak, foreign holdings accounted for about 1/4 of the total.
  - After the crisis, demand by U.S. households, non-financial businesses, and the rest of the world collapsed.
  - In contrast, financial sector holdings were relatively stable, suggesting that the explicit government guarantees of GSE securities in 2008 maintained some degree of confidence in their safety attributes.
  - The Fed's holdings of Agency&GSE assets increased as a result of its QE program.

Foreign holdings of Treasuries and LT corporate securities rising



Source: TIC

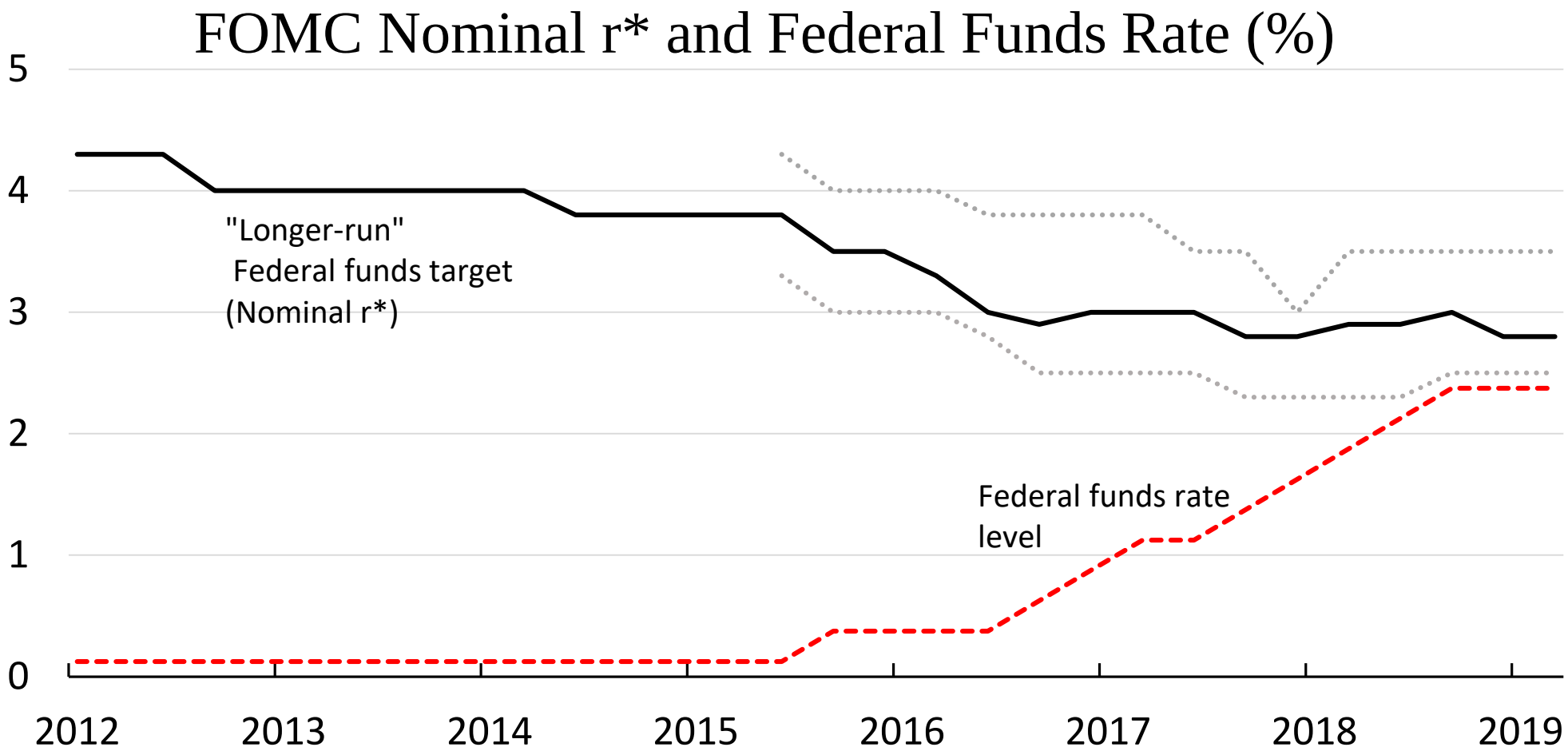
Low r* has implications for conduct of monetary policy

- Increases likelihood of running out of policy space,
  - by increasing frequency and duration of episodes in which policy rate constrained at the effective lower bound.
- Limits effectiveness of monetary policy to work through portfolio rebalancing channel
  - since there is less scope for lower rates to stimulate demand for other, riskier assets, and raise financial wealth.
- Fosters financial stability
  - by hurting financial sector profitability and increasing incentives to reach for yield, contributing to buildup of excessive risk-taking and over-leveraging.

r* is an anchor for monetary policy and setting the federal funds rate (FFR)

$$FFR = r^* + \pi^e + a(\pi - \pi^*) + b(y - y^*)$$

FOMC has raised funds rate toward the nominal r* target



Note: Nominal r* = r* + 2% inflation target

Concluding Thoughts

- The natural rate of interest, r* has fallen over the last several decades
- Many factors play a role
- Foreign demand for U.S. safe assets, particularly government safe assets, has increased dramatically
- For now, appears r* will remain low for the near future